

## ABSTRACT

1     The present invention provides a method and system for distributed residual tomographic  
2     velocity analysis using dense residual depth difference maps. Prestack seismic imaging  
3     is performed using an initial velocity field and interpreted horizons. A residual depth  
4     difference is estimated referenced to fixed offset and all horizons. Residual depth  
5     difference maps are computed for each offset and each horizon. The residual depth  
6     difference maps are back projected to determine slowness perturbation. The initial  
7     velocity model may be converted to slowness and the estimated slowness is composited  
8     therewith to produce a new slowness volume. The new slowness volume is converted to  
9     a new velocity volume for performing prestack seismic imaging. This process is repeated  
10    until the slowness perturbation is negligible or reaches a predetermined threshold.